Course Description

Prerequisites: MATH 1342 and MATH 1343. This course introduces statistical and computational concepts, techniques, tools and applications to analyze and interpret sports-related data from a managerial business perspective. Students will acquire technical and managerial skills in gathering, analyzing, making predictions on and visualizing diverse sports datasets. (The weekly workload may span 9 to 12 hours approximately and depends on individual students' background.)

Course Modality, Time and Location

This is a hybrid course for a 15-week schedule. The course has seven required face-to-face (F2F) meetings and additional online asynchronous components. The F2F meetings require in-person attendance at COB 207 during 9:05-10:00 am on the following dates: 8/25, 8/27, 9/3, 9/10, 9/24, 10/8, and 11/5, and will be used for initial introduction, and quizzes / exams / supplementary meetings. The online asynchronous components include watching video lectures, reading textbook(s) and supplementary materials, doing exercises, participating in discussion, and/or using other supplementary materials. Students must attend all F2F meetings at the specified dates/times and must submit all assessment items by the specified due dates/times.

Instructor Information

Dr. Wingyan Chung (wchung@uttyler.edu, office: COB 315.09)
Professor, Computer Science Dept.

Instructor Office Hours

Monday and Wednesday 10:00 am – 2:30 pm, 3:55 pm – 4:25 pm; and by appointment.
Emails will normally be answered within 2 business days; emails received during Friday–Sunday will be answered by the following Tuesday. DO NOT use the messaging system in Canvas and in the learning management system.

Textbook Information

The following textbooks are required throughout the semester (click the title(s) below to view the respective item(s) on a web browser).

- S = T. Severini "Analytic Methods in Sports, 2ed.," C. & H. (2020). `http://www.taseverini.com`.
- M = W. Wayne, S. Nestler, K. Pelechrinis "Mathletics: How Gamblers, Managers, and Fans Use Mathematics in Sports, 2ed.," Princeton University Press (2022), `https://mathleticsbook.com`.

Course Objectives

Upon successful completion of this course, students should be able to:

- Understand and explain statistical concepts, methods, and applications on sports data analysis,
- Apply a wide range of methods for sports data acquisition, representation, and reporting,
- Use computer software to perform sports data analysis and support decision making, and
- Build sports analytics models and apply them to solving organizational problems.

Course Materials and Submissions

This class uses Canvas for course documents, slides, submission of assessment items, assignments, online discussions, quizzes and other class-related materials. Students should check the Canvas site frequently during the semester to keep up to date about course activities. Quizzes and exam are due in F2F classes. All other submissions are due by 11:59:00 pm on the due date (except otherwise stated). Students should submit their work early to avoid last-minute hassles. Email submission is NOT accepted.

Course Grading

Assessment of student performance will be based on the following:

Prefix	Category	Points
A	Assignments	28
Q	Quizzes	32
C	Class Participation	12
E	Exam	28
Total Points		100

Grading Scale

A = 85.0 points or more
B = 70.0 to less than 85.0 points
C = 60.0 to less than 70.0 points
D = 50.0 to less than 60.0 points
F = Less than 50.0 points

Grade Composition

1. Assignments (A) – Individual, untimed, open-book, open-notes, assignments will contain objective questions, computer exercises, cases, and/or short-answer questions to help students review and practice course concepts and skills. Pause-and-resume is allowed before the submission deadline. Late submission (within 2 days after due date) will incur a 30% deduction in score. Submission is closed afterward. Missed submission will result in a zero score and cannot be made up (except for compliance with "Make-up or Extension" policy (see below)).

2. Quizzes (Q) – Individual, timed, close-book, close-notes written quizzes will be done in in-person F2F classes to assess student learning outcomes. No pause is allowed in each quiz. Missed submission will result in a zero score and cannot be made up (except for compliance with "Make-up or Extension" policy (see below)).

3. Class Participation (C) – Class Participation points will be scored by the quantity of quality discussion posts a student contributes regarding published articles relevant to the course topics. Each post is due on the specified due date of its submission period, after which the submission is closed. No late submission is allowed.

4. Exam (E) – An individual, timed, one-sitting, close-book, close-notes written examination will be done in an in-person F2F class to help students retain knowledge and assess learning outcomes. Objective-type questions (e.g., multiple choice, vocabularies, multiple selections, calculation, short

explanations) may appear in the exam. No pause is allowed in the exam. Missed submission will result in a zero score and cannot be made up (except for compliance with "Make-up or Extension" policy (see below)).

Course Policies

1. Make-up or Extension – Make-up or extension for missed submissions are available ONLY for valid reasons pre-approved by the Office of Student Accessibility and Resources (SAR) or for serious sickness / emergencies (with doctor's notices / proper documentations submitted prior to or in the same week of the deliverable) approved by the Campus Assessment, Response, & Evaluation (CARE) team. To be considered for make-up or a short extension (normally within 2 days after submission is closed), students must arrange with the aforementioned authorities and contact the instructor before the due date of the assessment items.

2. Student Responsibility – Students are required to take timely actions according to the course schedule, to check the learning management system and their university email regularly, and to perform all course-related tasks. Students should behave properly to facilitate active class learning.

3. Academic Integrity – Any act or attempt of academic dishonesty, such as (but not limited to) plagiarism, cheating, collusion, falsifying records, and copyright infringement, is strictly prohibited and will be punished according to the university policies (e.g., §8-802).

4. UT Tyler AI Statement – UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate. For this course, students must complete all assessment items exclusively by themselves. When use of AI tools is permissible in specific assessment items, it will be clearly stated in the directions, and all use of AI tools must be appropriately acknowledged and cited. Otherwise, the default is that AI tools are not allowed during any stage of an assessment.

Course Schedule

Start Date	Week	Topic	Materials	F2F	Due
8/25	1	Course Introduction; Describing sports data	Syllabus; S-Chs. 1	8/25, 8/27	QS
9/1	2	Summarizing sports data; Using Microsoft Excel	S-Ch. 2	9/3	Q1
9/8	3	Probability: How does uncertainty play in sports?	S-Ch. 3	9/10	Q2
9/15	4	Baseball – metrics, pythagorean theorem, linear weights, Monte Carlo simulation, and streakiness	M-Chs. 1-12	-	A1
9/22	5	Basketball – linear weights, +/- ratings, lineups, matchups, simulation	M-Chs. 28-32	9/24	Q3, C1
9/29	6	Margin of Error: How are players compared?	S-Ch. 4	-	A2
10/6	7	Statistical Significance: Was that luck or skill?	S-Ch. 4	10/8	Q4
10/13	8	Correlation: How does performance relate to other factors?	S-Ch. 5	-	C2
10/20	9	Linear Regression: How to predict players' performance accurately?	S-Ch. 6	-	A3
10/27	10	Multivariate Regression: How to use more variables to predict players' performance?	S-Ch. 7	-	C3
11/3	11	Football – metrics, state and value analysis	M-Chs. 20-21, 23-24	11/5	E
11/10	12	Analytics for soccer, hockey, volleyball, and e-sports	M-Chs. 39-43	-	C4
11/17	13	Advanced Models: Comparing NBA point predictors	S-Ch. 8	-	A4, C5
11/24	14	(No Class – Thanksgiving Holiday)	-	-	-
12/1	15	Advanced Models: Evaluating models to predict NHL team win	-	-	C6

Remarks

S – Course textbook "Analytic Methods in Sports, 2ed.," chapter by T. Severini

M – Course textbook "Mathletics, 2ed." chapter by W. Wayne et al.

A – Assignment

QS – Repeatable Syllabus Quiz (available in the UT Tyler Syllabus module). A satisfactory score is required to access subsequent modules.

C – Class Participation

F2F – Face-to-face in-person meeting date(s)

Q – Quiz (due in F2F class)

E – Exam (due in F2F class)

Coverage: Q1 (S1), Q2(S1-2), Q3 (S3, M1-12), Q4 (S4, M28-32), E (S1-7, M1-12, 28-32)